

CLAIMS

What is claimed is:

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1. *An apparatus comprising:*  
*at least one wireless transceiver to transmit and receive signals in*  
*accordance with a first and a second protocol to and from first and second network*  
*devices of a first and a second wireless network communicatively coupled to the*  
*apparatus; and*

*at least one controller manager coupled to said at least one wireless*  
*transceiver to operate said at least one wireless transceiver to perform said*  
*transmits and receives in accordance with said first and second protocols in a*  
*coordinated manner, taking into consideration quality of service criteria to be*  
*achieved for the respective protocols.*

2. *The apparatus of claim 1, wherein said at least one controller manager is*  
*equipped with logic to determine message types of first messages to be transmitted*  
*to a selected one or selected ones of said first network devices in accordance with*  
*said first protocol, and to give priority to said first messages over second messages*  
*to be transmitted to a selected one or selected ones of said second network devices*  
*in accordance with said second protocol, if message types of said first messages*  
*are determined of a multi-media type.*

3. *The apparatus of claim 1, wherein said at least one controller manager is*  
*equipped with logic to maintain a quality metric reflective of frequency of error for*  
*each voice stream, and to make its priority determination for messages competing to*

4 *be transmitted to said first and second network devices in accordance with said first*  
5 *and second protocols in view of said quality metric maintained for each voice*  
6 *stream.*

1 4. *The apparatus of claim 3, wherein said at least one controller manager is*  
2 *equipped with logic to increment a message transmitted counter corresponding to a*  
3 *voice stream whenever a message is transmitted for the voice stream, and not*  
4 *dropping a message of the voice stream until at least m messages have been*  
5 *successfully transmitted consecutively for the voice stream, where m is greater than*  
6 *1/e, and e is an error percentage rate not to be exceeded.*

1 5. *The apparatus of claim 4, wherein said at least one controller manager is*  
2 *further equipped with logic to reset a message transmitted counter corresponding to*  
3 *a voice stream when a message of the voice stream is dropped after at least m*  
4 *messages have been successfully transmitted consecutively for the voice stream.*

1 6. *The apparatus of claim 3, wherein said at least one controller manager is*  
2 *equipped with logic to increment a message transmitted counter corresponding to a*  
3 *voice stream whenever a message is transmitted for the voice stream in accordance*  
4 *with said first protocol, and not dropping a message of the voice stream in favor of a*  
5 *message of a first message type to be transmitted in accordance with said second*  
6 *protocol until at least m1 messages have been successfully transmitted*  
7 *consecutively for the voice stream, where m1 is greater than a first multiple of 1/e,*  
8 *and e is an error percentage rate not to be exceeded.*

1 7. The apparatus of claim 6, wherein said message of the first message type to  
2 be transmitted in accordance with said second protocol is an acknowledgement  
3 message.

1 8. The apparatus of claim 6, wherein said logic further not dropping a message  
2 of the voice stream in favor of a message of a second message type to be  
3 transmitted in accordance with said second protocol until at least  $m_2$  messages  
4 have been successfully transmitted consecutively for the voice stream, where  $m_2$  is  
5 greater than a second multiple of  $1/e$ , which is greater than  $m_1$ .

1 9. The apparatus of claim 8, wherein said message of the second message type  
2 to be transmitted in accordance with said second protocol is a data message.

1 10. The apparatus of claim 8, wherein said at least one controller manager is  
2 further equipped with logic to reset a message transmitted counter corresponding to  
3 a voice stream when a message of the voice stream is dropped after at least  $m_1/m_2$   
4 messages have been successfully transmitted consecutively for the voice stream.

1 11. The apparatus of claim 1, wherein the first and the second protocol are two  
2 protocols selected from a group consisting of Bluetooth, 802.11 frequency hopping,  
3 802.11 direct sequence, 802.11a, 802.11b, and Home RF.

1 12. The apparatus of claim 1, wherein the apparatus is a computer having a form  
2 factor selected from a group consisting of a desktop type, a notebook type and a  
3 palm sized type.

13. *In an apparatus having at least one wireless transceiver and at least one controller manager; a method of operation comprising:*  
*controlling said at least one wireless transceiver to transmit and receive signals in accordance with a first protocol to and from first network devices of a first wireless network; and*  
*controlling said at least one wireless transceiver to transmit and receive signals in accordance with a second protocol to and from second network devices of a second wireless network;*  
*wherein both of said controlling are performed in a coordinated manner, including taking into consideration quality of service criteria to be achieved for the respective protocols.*

14. *The method of claim 13, said taking into consideration quality of service criteria to be achieved for the respective protocols comprises determining message types of first messages to be transmitted to a selected one or selected ones of said first network devices in accordance with said first protocol, and giving priority to said first messages over second messages to be transmitted to a selected one or selected ones of said second network devices in accordance with said second protocol, if message types of said first messages are determined of a multi-media type.*

15. *The method of claim 13, wherein said taking into consideration quality of service criteria to be achieved for the respective protocols comprises maintaining a quality metric reflective of frequency of error for each voice stream, and making priority determination for messages competing to be transmitted to said first and*

5 second network devices in accordance with said first and second protocols in view  
6 of said quality metric maintained for each voice stream.

1 16. The method of claim 15, wherein said taking into consideration quality of  
2 service criteria to be achieved for the respective protocols comprises incrementing a  
3 message transmitted counter corresponding to a voice stream whenever a message  
4 is transmitted for the voice stream, and not dropping a message of the voice stream  
5 until at least  $m$  messages have been successfully transmitted consecutively for the  
6 voice stream, where  $m$  is greater than  $1/e$ , and  $e$  is an error percentage rate not to  
7 be exceeded.

1 17. The method of claim 16, wherein said taking into consideration quality of  
2 service criteria to be achieved for the respective protocols comprises resetting a  
3 message transmitted counter corresponding to a voice stream when a message of  
4 the voice stream is dropped after at least  $m$  messages have been successfully  
5 transmitted consecutively for the voice stream.

1 18. The method of claim 15, wherein said taking into consideration quality of  
2 service criteria to be achieved for the respective protocols comprises incrementing a  
3 message transmitted counter corresponding to a voice stream whenever a message  
4 is transmitted for the voice stream in accordance with said first protocol, and not  
5 dropping a message of the voice stream in favor of a message of a first message  
6 type to be transmitted in accordance with said second protocol until at least  $m1$   
7 messages have been successfully transmitted consecutively for the voice stream,  
8 where  $m1$  is greater than a first multiple of  $1/e$ , and  $e$  is an error percentage rate not  
9 to be exceeded.

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1 19. The method of claim 18, wherein said message of the first message type to  
2 be transmitted in accordance with said second protocol is an acknowledgement  
3 message.

1 20. The method of claim 18, wherein said taking into consideration quality of  
2 service criteria to be achieved for the respective protocols further comprises not  
3 dropping a message of the voice stream in favor of a message of a second  
4 message type to be transmitted in accordance with said second protocol until at  
5 least  $m_2$  messages have been successfully transmitted consecutively for the voice  
6 stream, where  $m_2$  is greater than a second multiple of  $1/e$ , which is greater than  $m_1$ .

1 21. The method of claim 20, wherein said message of the second message type  
2 to be transmitted in accordance with said second protocol is a data message.

1 22. The method of claim 20, wherein said taking into consideration quality of  
2 service criteria to be achieved for the respective protocols further comprises  
3 resetting a message transmitted counter corresponding to a voice stream when a  
4 message of the voice stream is dropped after at least  $m_1/m_2$  messages have been  
5 successfully transmitted consecutively for the voice stream.

1 23. A collection of networked apparatuses comprising:  
2 a first plurality of apparatuses wirelessly networked together, with each  
3 apparatus being equipped to communicate wirelessly in accordance with a first  
4 protocol;

5 a second plurality of apparatuses wirelessly networked together, with each  
6 apparatus being equipped to communicate wirelessly in accordance with a second  
7 protocol; and

8 a multi-protocol apparatus equipped to communicate wirelessly with said first  
9 and second plurality of apparatuses in accordance with said first and second  
10 protocols respectively, in a coordinated manner, including having been equipped to  
11 take into consideration quality of service criteria to be achieved for the respective  
12 protocols..

1 24. The apparatuses of claim 23, wherein said multi-protocol apparatus is  
2 equipped with logic to determine message types of first messages to be transmitted  
3 to a selected one or selected ones of said first network devices in accordance with  
4 said first protocol, and to give priority to said first messages over second messages  
5 to be transmitted to a selected one or selected ones of said second network devices  
6 in accordance with said second protocol, if message types of said first messages  
7 are determined of a multi-media type.

1 25. The apparatuses of claim 23, wherein said multi-protocol apparatus is  
2 equipped with logic to maintain a quality metric reflective of frequency of error for  
3 each voice stream, and to make its priority determination for messages competing to  
4 be transmitted to said first and second network devices in accordance with said first  
5 and second protocols in view of said quality metric maintained for each voice  
6 stream.

1 26. The apparatuses of claim 25, wherein said multi-protocol apparatus is  
2 equipped with logic to increment a message transmitted counter corresponding to a

3 voice stream whenever a message is transmitted for the voice stream, and not  
4 dropping a message of the voice stream until at least  $m$  messages have been  
5 successfully transmitted consecutively for the voice stream, where  $m$  is greater than  
6  $1/e$ , and  $e$  is an error percentage rate not to be exceeded.

1 27. The apparatuses of claim 26, wherein said multi-protocol apparatus is further  
2 equipped with logic to reset a message transmitted counter corresponding to a voice  
3 stream when a message of the voice stream is dropped after at least  $m$  messages  
4 have been successfully transmitted consecutively for the voice stream.

1 28. The apparatuses of claim 25, wherein said multi-protocol apparatus is  
2 equipped with logic to increment a message transmitted counter corresponding to a  
3 voice stream whenever a message is transmitted for the voice stream in accordance  
4 with said first protocol, and not dropping a message of the voice stream in favor of a  
5 message of a first message type to be transmitted in accordance with said second  
6 protocol until at least  $m_1$  messages have been successfully transmitted  
7 consecutively for the voice stream, where  $m_1$  is greater than a first multiple of  $1/e$ ,  
8 and  $e$  is an error percentage rate not to be exceeded.

1 29. The apparatuses of claim 28, wherein said message of the first message type  
2 to be transmitted in accordance with said second protocol is an acknowledgement  
3 message.

1 30. The apparatuses of claim 28, wherein said logic further not dropping a  
2 message of the voice stream in favor of a message of a second message type to be  
3 transmitted in accordance with said second protocol until at least  $m_2$  messages

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